

WHAT IS CLAIMED IS:

1. An information transmission system comprising:

5 a set of one or more computer memory devices on which is stored an information database;

database editing means, coupled to said one or more computer memory devices, for generating a hierarchically arranged set of indices for referencing data in said information database, including distinct indices for referencing distinct portions thereof, and for embedding said indices in said information database;

10 scheduling means for scheduling transmission of selected portions of said information database, including assigning each selected portion of said information database one or more scheduled transmission times;

15 transmission means, coupled to said scheduling means and said one or more computer memory devices, for transmitting a stream of data packets containing said selected portions of said information database in accordance with said scheduled transmission times;

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20 said scheduling means including means for dividing said selected portions of said information database into a prioritized set of tiers, wherein all the selected portions of said information database in each tier are transmitted at a corresponding repetition rate, wherein the repetition rate for higher priority tiers is higher than the repetition rate for lower priority tiers; and

25 subscriber stations which receive said transmitted stream of data packets, each subscriber station including filtering means for specifying a set of requested data packets which comprises a subset of said transmitted data packets and for downloading into a memory storage device those of said received data packets which match said specified set of requested data packets.

2. The information transmission system of claim 1, wherein

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said set of indices include timestamps therein indicating when each said portion of the information database referenced by an index is schedule to be transmitted; and

5 said subscriber stations including means for decoding said timestamps in said indices;

whereby subscribers can be informed as to the how long it will take to receive a specified portion of the information database.

10 3. The information transmission system of claim 2, wherein each timestamp includes a repetition rate value indicating how often the associated portion of the information database is transmitted, and a time skew value indicating in conjunction with said repetition rate value a scheduled transmission time for the associated portion of the information database.

15 4. The information transmission system of claim 3, wherein the timestamp in indices referencing portions of the information database not scheduled for transmission is null, indicating that said referenced portions of the information database are transmitted only upon request by subscribers.

20 5. The information transmission system of claim 1, wherein said transmission means includes a central program transmission station which transmits said stream of data packets, and one or more cable television systems which receive the transmitted stream of data packets and retransmit said stream of data packets via cables to a set of subscribers.

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25 6. The information transmission system of claim 5, wherein one or more of said cable television systems includes the ability to insert into the stream of retransmitted data packets additional "local programming" data packets.

7. The information transmission system of claim 1, wherein a portion of the transmission bandwidth available to said transmission means is reserved for transmitting portions of said information database requested by subscribers;

5 said information transmission system including subscriber request response means for receiving requests from subscribers, said requests each specifying a portion of said information database; and

said scheduling means including means for scheduling transmission of requested portions of said information database.

10 8. The information transmission system of claim 1, wherein one or more subsets of said subscriber stations are interconnected via a local area network, including a network server which receives said transmitted stream of data packets on behalf of an associated set of subscribers, said network server including
15 means for referencing a specified set of data packets requested by said associated set of subscribers, and means for downloading into a memory storage device those of said received data packets which match said specified set of requested data packets;

20 whereby overhead associated with receiving the stream of data packets and downloading for storage a specified subset thereof is shared by a set of subscribers.

9. The information transmission system of claim 1, wherein said transmission means transmits said data packets using multiple transmission channels; and said subscriber stations include means for receiving data packets for each of
25 said multiple transmission channels.

10. The information transmission system of claim 9, wherein said information database includes video program materials as well as non-video information;

said transmission means transmits data packets containing at least selected portions of said video program materials on at least one of said multiple transmission channels and transmits primarily non-video information on at least one other one of said multiplicity of transmission channels; and

5 a multiplicity of said subscriber stations include means for receiving and storing video program materials.

11. The information transmission system of claim 1, said filtering means comprising a buffer for temporarily storing received data packets, a filter list storage device for storing packet filter data referencing said specified set of requested data packets, and processing means for comparing said data packets temporarily stored in said buffer with said packet filter data and then forwarding those data packets in said buffer which match said packet filter data to a predefined destination,

15 whereby each subscriber station receives all transmitted data packets but forwards only requested data packets to said predefined destination.

12. The information transmission system of claim 1, said filtering means including look ahead means for automatically specifying additional data packets to be downloaded, wherein said requested data packets and said additional data packets each have associated indices at defined positions in said hierarchically arranged set of indices and said additional data packets are selected using predefined criteria with regard to said defined positions of their associated indices relative to the defined positions of said requested data packets;

25 whereby said subscriber station automatically downloads data packets containing data related to data contained in requested data packets, thereby anticipating potential additional requests that a user may make and speeding access thereto.

13. An information transmission system comprising:
a set of one or more computer memory devices on which is stored an
information database;

5 database editing means, coupled to said one or more computer memory
devices, for generating a hierarchically arranged set of indices for referencing
data in said information database, including distinct indices for referencing distinct
portions thereof, and for embedding said indices in said information database;

scheduling means for scheduling transmission of selected portions of said
information database, including assigning each selected portion of said
10 information database one or more scheduled transmission times;

transmission means, coupled to said scheduling means and said one or
more computer memory devices, for transmitting a stream of data packets
containing said selected portions of said information database in accordance
with said scheduled transmission times; and

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15 a multiplicity of subscriber stations for receiving said transmitted stream
of data packets, each subscriber station including filtering means for specifying
a set of requested data packets which comprises a subset of said transmitted
data packets and for downloading into a memory storage device those of said
received data packets which match said specified set of requested data packets;
20 said filtering means furthermore including look ahead means for automatically
specifying additional data packets to be downloaded, wherein said requested
data packets and said additional data packets each have associated indices at
defined positions in said hierarchically arranged set of indices and said additional
data packets are selected using predefined criteria with regard to said defined
25 positions of their associated indices relative to the defined positions of said
requested data packets;

whereby said subscriber station automatically downloads data packets
containing data related to data contained in requested data packets, thereby
anticipating potential additional requests that a user may make and speeding
30 access thereto.

14. The information transmission system of claim 13, wherein
said set of indices include timestamps therein indicating when each said
portion of the information database referenced by an index is schedule to be
transmitted; and

5 said subscriber stations including means for decoding said timestamps
in said indices;

whereby subscribers can be informed as to the how long it will take to
receive a specified portion of the information database.

10 15. The information transmission system of claim 14, wherein
each timestamp includes a repetition rate value indicating how often the
associated portion of the information database is transmitted, and a time skew
value indicating in conjunction with said repetition rate value a scheduled
transmission time for the associated portion of the information database.

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16. The information transmission system of claim 15, wherein the timestamp
in indices referencing portions of the information database not scheduled for
transmission is null, indicating that said referenced portions of the information
database are transmitted only upon request by subscribers.

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17. The information transmission system of claim 13, wherein
said transmission means includes a central program transmission station
which transmits said stream of data packets, and one or more cable television
systems which receive the transmitted stream of data packets and retransmit
25 said stream of data packets via cables to a set of subscribers.

18. The information transmission system of claim 17, wherein one or more
of said cable television systems includes the ability to insert into the stream of
retransmitted data packets additional "local programming" data packets.

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19. The information transmission system of claim 13, wherein a portion of the transmission bandwidth available to said transmission means is reserved for transmitting portions of said information database requested by subscribers;

5 said information transmission system including subscriber request response means for receiving requests from subscribers, said requests each specifying a portion of said information database; and

said scheduling means including means for scheduling transmission of requested portions of said information database.

Sub 10 20. The information transmission system of claim 13, wherein one or more subsets of said subscriber stations are interconnected via a local area network, including a network server which receives said transmitted stream of data packets on behalf of an associated set of subscribers, said network server including means for referencing a specified set of data packets requested by said 15 associated set of subscribers, and means for downloading into a memory storage device those of said received data packets which match said specified set of requested data packets;

20 whereby overhead associated with receiving the stream of data packets and downloading for storage a specified subset thereof is shared by a set of subscribers.

Sub 25 21. The information transmission system of claim 13, wherein said transmission means transmits said data packets using multiple transmission channels; and said subscriber stations include means for receiving data packets for each of said multiple transmission channels.

Sub 22. The information transmission system of claim 21, wherein said information database includes video program materials as well as non-video information;

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said transmission means transmits data packets containing at least selected portions of said video program materials on at least one of said multiple transmission channels and transmits primarily non-video information on at least one other one of said multiplicity of transmission channels; and

5 a multiplicity of said subscriber stations include means for receiving and storing video program materials.

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23. The information transmission system of claim 13, said subscriber stations including a data filter subsystem comprising a buffer for temporarily storing received data packets, a filter list storage device for storing packet filter data 10 referencing said specified set of requested data packets, and processing means for comparing said data packets temporarily stored in said buffer with said packet filter data and then forwarding those data packets in said buffer which match said packet filter data to a predefined destination;

15 whereby each subscriber station receives all transmitted data packets but forwards only requested data packets to said predefined destination.

24. An information transmission method comprising the steps of:
storing an information database on one or more memory devices;
generating and storing on said memory devices a hierarchically arranged
set of indices for referencing data in said information database, including distinct
5 indices for referencing distinct portions thereof, and embedding said indices in
said information database;

scheduling transmission of selected portions of said information database,
including assigning each selected portion of said information database one or
more scheduled transmission times;

10 transmitting a stream of data packets containing said selected portions
of said information database in accordance with said scheduled transmission
times;

said scheduling step including dividing said selected portions of said
information database into a prioritized set of tiers, wherein all the selected
15 portions of said information database in each tier are transmitted at a
corresponding repetition rate, wherein the repetition rate for higher priority tiers
is higher than the repetition rate for lower priority tiers;

receiving said transmitted stream of data packets at subscriber stations;
at each subscriber station, storing filter data specifying a set of requested
20 data packets which comprises a subset of said transmitted data packets; and
at each subscriber station, downloading into a memory storage device
those of said received data packets which match said specified set of requested
data packets.

25 25. The information transmission method of claim 24, wherein said generating
step generates indices including timestamps therein, said timestamps indicating
when each said portion of the information database referenced by an index is
schedule to be transmitted;

said method including decoding said timestamps in said indices at said
30 subscriber stations;

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whereby subscribers can be informed as to the how long it will take to receive a specified portion of the information database.

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~~28.~~ The information transmission method of claim ¹⁷~~25~~, wherein
- 5 each timestamp includes a repetition rate value indicating how often the associated portion of the information database is transmitted, and a time skew value indicating in conjunction with said repetition rate value a scheduled transmission time for the associated portion of the information database.
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10 ~~27.~~ The information transmission system of claim ¹⁷~~26~~, wherein the timestamp in indices referencing portions of the information database not scheduled for transmission is null, indicating that said referenced portions of the information database are transmitted only upon request by subscribers.

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28. The information transmission method of claim 24, wherein said transmitting step includes transmitting said stream of data packets to one or more cable television systems which receive the transmitted stream of data packets and retransmit said stream of data packets via cables to a set of subscribers.
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²¹ ~~29.~~ The information transmission method of claim ²⁰~~28~~, wherein one or more of said cable television systems inserts into the stream of retransmitted data packets additional "local programming" data packets.

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25 ~~30.~~ The information transmission method of claim ¹⁶~~24~~, wherein said scheduling step includes reserving a portion of transmission bandwidth available for said transmitting step for transmitting portions of said information database requested by subscribers;
- said method including receiving requests from subscribers, said requests
- 30 each specifying a portion of said information database; and

said scheduling step including scheduling transmission of requested portions of said information database.

31. The information transmission method of claim 24, wherein one or more subsets of said subscriber stations are interconnected via a local area network including a network server;

5 said method including receiving at said network server said transmitted stream of data packets on behalf of an associated set of subscribers, storing data in said network server referencing a specified set of data packets requested by said associated set of subscribers, and downloading into a memory storage device associated with said network server those of said received data packets which match said specified set of requested data packets;

10 whereby overhead associated with receiving the stream of data packets and downloading for storage a specified subset thereof is shared by a set of subscribers.

24 32. The information transmission method of claim 16, wherein said transmitting step transmits said data packets using multiple transmission channels; and said receiving step includes receiving data packets from selected ones of said multiple transmission channels.

25 33. The information transmission method of claim 32, wherein said information database includes video program materials as well as non-video information;

25 said transmitting step transmits data packets containing at least selected portions of said video program materials on at least one of said multiple transmission channels and transmits primarily non-video information on at least one other one of said multiplicity of transmission channels; and

30 at a multiplicity of said subscriber stations, receiving and storing video program materials.

34. The information transmission method of claim 24, said receiving and downloading steps including:

at each subscriber stations, temporarily storing received data packets in a buffer, storing a filter list comprising packet filter data referencing said specified set of requested data packets, comparing said data packets temporarily stored in said buffer with said packet filter data and then forwarding those data packets in said buffer which match said packet filter data to a predefined destination;

whereby each subscriber station receives all transmitted data packets but forwards only requested data packets to said predefined destination.

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The information transmission method of claim ¹⁶~~24~~, said storing filter data step furthermore including automatically specifying additional data packets to be downloaded, wherein said requested data packets and said additional data packets each have associated indices at defined positions in said hierarchically arranged set of indices and said additional data packets are selected using predefined criteria with regard to said defined positions of their associated indices relative to the defined positions of said requested data packets;

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whereby said subscriber station automatically downloads data packets containing data related to data contained in requested data packets, thereby anticipating potential additional requests that a user may make and speeding access thereto.

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36. An information transmission method comprising the steps of:
storing an information database on one or more memory devices;
generating and storing on said memory devices a hierarchically arranged
set of indices for referencing data in said information database, including distinct
5 indices for referencing distinct portions thereof, and embedding said indices in
said information database;

scheduling transmission of selected portions of said information database,
including assigning each selected portion of said information database one or
more scheduled transmission times;

10 transmitting a stream of data packets containing said selected portions
of said information database in accordance with said scheduled transmission
times;

receiving said transmitted stream of data packets at subscriber stations;

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15 at each subscriber station, storing filter data specifying a set of requested
data packets which comprises a subset of said transmitted data packets; and
at each subscriber station, downloading into a memory storage device
those of said received data packets which match said specified set of requested
data packets.

said storing filter data step furthermore including automatically specifying
20 additional data packets to be downloaded, wherein said requested data packets
and said additional data packets each have associated indices at defined
positions in said hierarchically arranged set of indices and said additional data
packets are selected using predefined criteria with regard to said defined positions
of their associated indices relative to the defined positions of said requested data
25 packets;

whereby said subscriber station automatically downloads data packets
containing data related to data contained in requested data packets, thereby
anticipating potential additional requests that a user may make and speeding
access thereto.

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37. The information transmission method of claim 36, wherein said generating step generates indices including timestamps therein, said timestamps indicating when each said portion of the information database referenced by an index is scheduled to be transmitted;

5 said method including decoding said timestamps in said indices at said subscriber stations;

 whereby subscribers can be informed as to the how long it will take to receive a specified portion of the information database.

10 38. The information transmission method of claim 37, wherein
 each timestamp includes a repetition rate value indicating how often the associated portion of the information database is transmitted, and a time skew value indicating in conjunction with said repetition rate value a scheduled transmission time for the associated portion of the information database.

15 39. The information transmission system of claim 38, wherein the timestamp in indices referencing portions of the information database not scheduled for transmission is null, indicating that said referenced portions of the information database are transmitted only upon request by subscribers.

20 40. The information transmission method of claim 36, wherein
 said transmitting step includes transmitting said stream of data packets to one or more cable television systems which receive the transmitted stream of data packets and retransmit said stream of data packets via cables to a set
25 of subscribers.

 41. The information transmission method of claim 40, wherein one or more of said cable television systems inserts into the stream of retransmitted data packets additional "local programming" data packets.

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42. The information transmission method of claim 36, wherein said scheduling step includes reserving a portion of transmission bandwidth available for said transmitting step for transmitting portions of said information database requested by subscribers;

5 said method including receiving requests from subscribers, said requests each specifying a portion of said information database; and

 said scheduling step including scheduling transmission of requested portions of said information database.

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10 43. The information transmission method of claim 36, wherein one or more subsets of said subscriber stations are interconnected via a local area network including a network server;

 said method including receiving at said network server said transmitted stream of data packets on behalf of an associated set of subscribers, storing
15 data in said network server referencing a specified set of data packets requested by said associated set of subscribers, and downloading into a memory storage device associated with said network server those of said received data packets which match said specified set of requested data packets;

 whereby overhead associated with receiving the stream of data packets
20 and downloading for storage a specified subset thereof is shared by a set of subscribers.

44. The information transmission method of claim 36, wherein said transmitting step transmits said data packets using multiple transmission channels; and said
25 receiving step includes receiving data packets from selected ones of said multiple transmission channels.

45. The information transmission method of claim 44, wherein
 said information database includes video program materials as well as
30 non-video information;

said transmitting step transmits data packets containing at least selected portions of said video program materials on at least one of said multiple transmission channels and transmits primarily non-video information on at least one other one of said multiplicity of transmission channels; and

5 at a multiplicity of said subscriber stations, receiving and storing video program materials.

46. The information transmission method of claim 36, said receiving and downloading steps including:

10 at each subscriber stations, temporarily storing received data packets in a buffer, storing a filter list comprising packet filter data referencing said specified set of requested data packets, comparing said data packets temporarily stored in said buffer with said packet filter data and then forwarding those data packets in said buffer which match said packet filter data to a predefined destination;

15 whereby each subscriber station receives all transmitted data packets but forwards only requested data packets to said predefined destination.